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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/633,132	08/04/2000	Cem Basceri	M406 5.0139/P139-A	2413
24998	7590	08/20/2004	EXAMINER	
DICKSTEIN SHAPIRO MORIN & OSHINSKY LLP			LEE, EUGENE	
2101 L STREET NW			ART UNIT	
WASHINGTON, DC 20037-1526			PAPER NUMBER	
			2815	

DATE MAILED: 08/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/633,132

Applicant(s)

BASCERI, CEM

Examiner

Eugene Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 39,41-46,48,50-55,74-83 and 94-97 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 39, 41-46, 48, 50-55, 74-83, and 94-97 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

Applicant's arguments, filed 6/3/04, with respect to 39, 41-46, 48, 50-55, 74-83, and 94-97 have been fully considered and are persuasive. The rejection of claims 74, 80-83, 96, and 97, and the allowance of claims 39, 41-46, 48, 50-55, 75-79, 94 and 95 have been withdrawn.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 39, and 41 thru 43, and 46 are rejected under 35 U.S.C. 102(e) as being anticipated by Laibowitz et al. 6,088,216. Laibowitz discloses (see, for example, FIG. 7) a DRAM capacitor comprising a substrate (material layer) 12, whereupon a mesa (a first level and a second level, sidewall region) 51 and high dielectric film (high dielectric constant thin film material) 56 are formed.

Regarding the limitation of “a BST film”, see column 2, lines 55-\* where Laibowitz discloses the use of barium titanate, strontium titanate and *its mixtures*.

Regarding the limitation “ion implantation doped”, this is a product-by-process limitation that only describes the formation of a BST high dielectric constant thin film material but does not impart any structural limitations to the applicant's claimed product.

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Regarding the limitation “having a substantially uniform stoichiometry”, Laibowitz discloses a high dielectric layer comprising materials such as barium titanate, strontium titanate, and mixtures of barium titanate and strontium titanate film. Laibowitz nowhere discloses that when these materials are placed on the mesa, the material (i.e. stoichiometry) of the layer changes. Laibowitz discloses the film as a barium titanate, strontium titanate, and mixtures of barium titanate and strontium titanate, and it would be expected that the stoichiometry would remain unchanged on the sidewalls since the film, according to Laibowitz, does not change into another chemical compound on the sidewalls. Laibowitz does not disclose that the high dielectric film changes on the sidewalls of the mesa.

Regarding claims 41-43, the limitation “is doped with a dopant selected from the group consisting of barium, strontium, and titanium”, this is a product-by-process limitation that only describes the formation of a BST high dielectric constant thin film material but does not impart any structural limitations to the applicant’s claimed product.

3. Claims 74 thru 77, 80 thru 83, 94 thru 96 are rejected under 35 U.S.C. 102(e) as being anticipated by Hosotani et al. 6,051,859. Hosotani discloses (see, for example FIG. 7B and column 12, lines 31-44) a capacitor comprising a first electrode 32, dielectric film 34, and second electrode 35. In column 11, lines 45-47 and column 14, lines 7-10, Hosotani discloses the dielectric film as being (Ba,Sr) TiO<sub>3</sub>.

Regarding the limitation “ion implantation doped”, this is a product-by-process limitation that only describes the formation of a BST high dielectric constant thin film material but does not impart any structural limitations to the applicant’s claimed product.

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Regarding the limitation “having a substantially uniform stoichiometry”, Hosotani discloses a dielectric film comprising the material of (Ba,Sr) TiO<sub>3</sub> (BST). Hosotani nowhere discloses that when this material is placed on the first electrode, the material (i.e. stoichiometry) changes. Hosotani discloses the dielectric film as (Ba,Sr) TiO<sub>3</sub> (BST), and it would be expected that the stoichiometry would remain unchanged on the sidewalls since the film, according to Hosotani, does not change into another chemical compound on the sidewalls. Hosotani does not disclose that the dielectric film changes on the sidewalls.

Regarding claims 76 and 77, the limitation “is doped with a dopant selected from the group consisting of Ba, and Sr”, this is a product-by-process limitation that only describes the formation of a BST high dielectric constant thin film material but does not impart any structural limitations to the applicant’s claimed product.

Regarding claim 80, see, for example, column 13, lines 43-53, wherein Hosotani discloses the electrodes being made of Pt.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laibowitz et al. 6,088,216 as applied to claims 39, and 41 thru 43, and 46 above.

Laibowitz discloses the claimed invention except for a Ti percentage of from about 50%

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to about 53.5% throughout said BST high dielectric thin film material. However, it would have been obvious to one of ordinary skill in the art at the time of invention was made to dope with Ti until this range is met, in order to have a high dielectric film, and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim 45, Laibowitz discloses the claimed invention except for the ratio of Ba to Sr being about 70:30. However, it would have been obvious to one of ordinary skill in the art at the time of invention was made to have this the ratio of Ba to Sr being about 70:30, in order to have a high dielectric film, and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

6. Claims 48, and 50 thru 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laibowitz et al. '216 as applied to claims 39, and 41-43, and 46 above, and further in view of Leung et al. '762. Laibowitz does not have a capping layer. However, Leung discloses that a capping layer may be formed to encapsulate a capacitor structure. See, for example, column 2, lines 27-56. Leung teaches that adding a capping layer protects the capacitor from diffusion and contamination. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to have a capping layer in the capacitor structure so that the above-cited problems can be avoided.

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Regarding claim 53, Laibowitz in view of Leung discloses the claimed invention except for a Ti percentage of from about 50% to about 53.5% throughout said BST high dielectric thin film material. However, it would have been obvious to one of ordinary skill in the art at the time of invention was made to dope with Ti until this range is met, in order to have a high dielectric film, and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim 54, Laibowitz in view of Leung discloses the claimed invention except for the ratio of Ba to Sr being about 70:30. However, it would have been obvious to one of ordinary skill in the art at the time of invention was made to have this the ratio of Ba to Sr being about 70:30, in order to have a high dielectric film, and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

7. Claims 78, 79 and 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosotani et al. '859 as applied to claims 74-77, and 80-83, and 94-96 above.

Hosotani discloses the claimed invention except for a Ti percentage of from about 50% to about 53.5% throughout said BST high dielectric thin film material. However, it would have been obvious to one of ordinary skill in the art at the time of invention was made to dope with Ti until this range is met, in order to have a high dielectric film, and since it has been held that where the general conditions of a claim are disclosed in the prior art,

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discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim 79, Hosotani discloses the claimed invention except for the ratio of Ba to Sr being about 70:30. However, it would have been obvious to one of ordinary skill in the art at the time of invention was made to have this the ratio of Ba to Sr being about 70:30, in order to have a high dielectric film, and since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

#### ***Product-by-Process Limitations***

8. While not objectionable, the Office reminds Applicant that “product by process” limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or *otherwise*. Note that applicant has the burden of proof in such cases, as the above case law makes clear. Thus, no patentable weight will be given to those process steps which do not add structural limitations to the final product.



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Since the applicant's claims are directed towards device, only the limitations that determine the device's final structure will be afforded patentable weight.

***Response to Arguments***

9. Applicant's arguments with respect to claims 39, 41-46, 48, 50-55, 74-83, and 94-97 have been considered but are moot in view of the new ground(s) of rejection.

**INFORMATION ON HOW TO CONTACT THE USPTO**

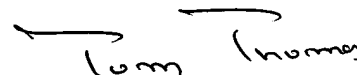
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Eugene Lee  
August 8, 2004

A handwritten signature in black ink that reads "Tom Thomas". The signature is written in a cursive style with a horizontal line above the first "T" and another horizontal line above the second "T".

TOM THOMAS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800